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SCIENCE & TECHNOLOGY INITIATIVE INDUSTRIAL HEARTLAND

GREATER HAMILTON

**RESTRUCTURING
FOR THE
GLOBAL MARKET**

November 16, 1989

ROBERT KUHNS & ASSOCIATES PROJECT CONSULTANTS



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SCIENCE & TECHNOLOGY INITIATIVE INDUSTRIAL HEARTLAND
G R E A T E R H A M I L T O N

RESTRUCTURING FOR THE GLOBAL MARKET



Industry, Science and
Technology Canada

Industrie, Sciences et
Technologie Canada


This survey was co-funded by the *Economic Development
Department of the Regional Municipality of Hamilton-
Wentworth* and *Industry, Science and Technology Canada*

GREATER HAMILTON
SCIENCE & TECHNOLOGY INITIATIVE
INDUSTRIAL HEARTLAND


TECHNOLOGY TRANSFER NEEDS IN THE
INDUSTRIAL HEARTLAND

Some months ago our two offices decided to co-sponsor and finance a survey project of technology transfer needs of certain industry sectors in the Hamilton-Wentworth Region and contiguous areas. Both levels of government were increasingly conscious of the technology imperative as a driving force in making economies viable and competitive. The same force was recognized as an essential element in the encouraging and developing by communities of new business opportunities. In addition, the pressures of foreign competition were making obvious the increasingly exposed position of numerous small and medium-sized businesses more accustomed to the stable demands of somewhat localized markets. Before attempting to take action to help meet these challenges, we wanted a more accurate definition of what would be needed from the perspective of the business community and hence the survey.

It is therefore our pleasure to present the results of our project and hope the recommendations merit your further consideration for additional action.



R. J. (Reg) Whynott
Chairman
Regional Municipality
of Hamilton-Wentworth



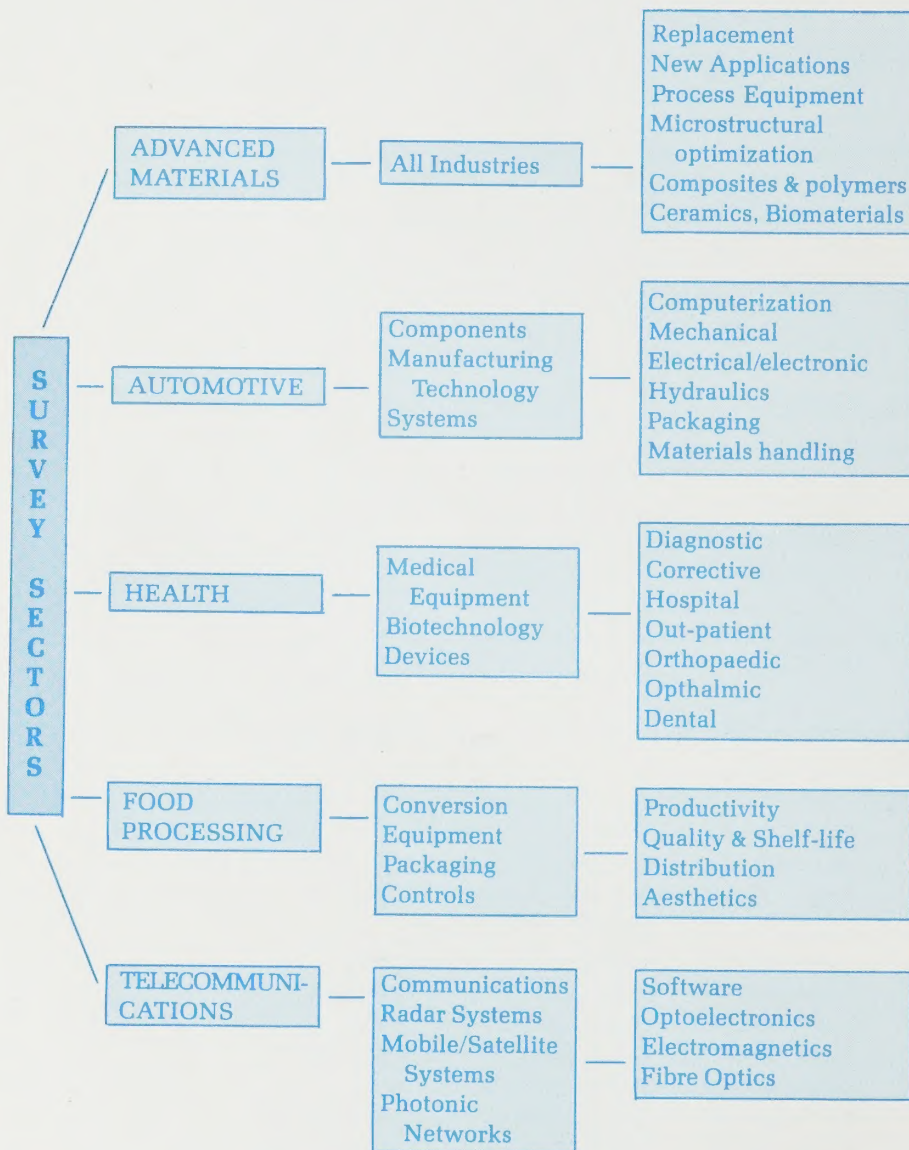
W. W. Cram
Executive Director
ISTC - Ontario

INDEX

Executive Summary	4
Preface	8
Facts and Quotes	9
Background	13
The Sectors	15
The Project	16
Resource Inventory	16
Needs Analysis	17
Survey Area	18
Interviews	19
Assistance Programs	20
Environment	21
The Sectors	23
Automotive	23
Advanced Industrial Materials	26
Health Care	28
Food Processing	31
Telecommunications	34
Key Findings	37
Summary	41
Recommendations	42
Appendices	44
Appendix I Guest List - June 22, 1988	44
Appendix II Matrix - Automotive	45
Appendix III Matrix - Advanced Materials	46
Appendix IV Matrix - Health Care	47
Appendix V Matrix - Food Processing	48
Appendix VI Matrix - Telecommunications	49
Appendix VII Questionnaire Guidelines	50
Appendix VIII Guest List - February 9, 1989	52
Appendix IX Automotive Tiers	53
Appendix X Manager of Technology Transfer	54
Appendix XI Technology Information Centre	55

SCIENCE & TECHNOLOGY INITIATIVE

INDUSTRIAL HEARTLAND

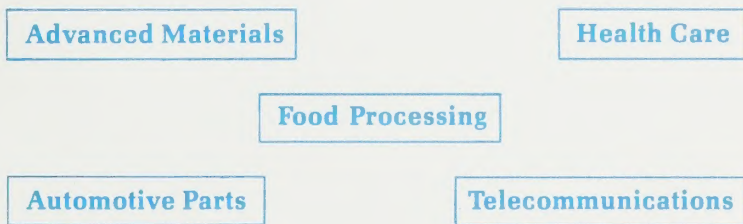


(Fig. 1)

EXECUTIVE SUMMARY

In early 1988, discussions among representatives from business, government and educational institutions indicated a general concern regarding the overall competitiveness of the Hamilton-Wentworth Region. Those involved were part of a networking system in place within the Region and each was an integral part of the Region's strategy for growth through diversification. The impact of the economic downturn of the early 1980's on an area traditionally oriented towards heavy industry had been significant and had intensified the Region's efforts towards diversification. The **present concern related to the opportunities and threats posed by the opening of global markets and increasing technological competitiveness.** As a result of this forming consensus, leaders from industry, government and the Region's educational institutions, sparked by the Region's Business Advisory Centre and the Toronto office of I.S.T.C., gathered to explore the question in more depth and to develop an action program. Further investigation of the needs *perceived* by business and the resources existing to assist the businesses, particularly small and medium size enterprises (**SME's**), was needed and a survey was commissioned. This report summarizes that project.

Five sectors which require advanced technologies to be competitive and each of which is an integral part of the Region's economic strategy had been chosen for examination. The sectors included: (Fig. 1)



Although each sector has unique traits, vis-a-vis fast paced telecommunications versus conservative food processing, there are a number of commonalities. In each, the principal factors driving the process of change include:

- ☐ **Increasing international competitiveness;**
- ☐ **The demand for more responsive management;**
- ☐ **A relentless drive for more cost effective performance.**

These factors are evident and may be acknowledged by business, but they are not always addressed. Recognition of these forces by industry leaders, however, was the basis for this survey.

Although the focus of the survey was directed towards SME's and the interviews were concentrated accordingly, interviews and discussions also were held with senior executives and managers of large multinationals, institutions and industry analysts who would have global insight into the technological trends and play a role in influencing the technological pace of their sectors. Those interviewed among the SME's were either the owner or someone with direct responsibility for the company's operations. Additionally, because the economic influence of Greater Hamilton extends well beyond the core of Hamilton-Wentworth and because of its strategic trading location, the survey area covered the entire *Industrial Heartland*.

An inventory of available resources, both public and private sector, required considerable effort to develop. The result was a matrix for each sector (copies included in the appendices) which then was used as a tool for discussion during the interviews. This process revealed:

- ☐ **There are many service and financial assistance programs available to businesses;**
- ☐ **Most businesses, large and small, are not aware of the programs available;**
- ☐ **There is no easy way to learn what is available, let alone make it accessible;**
- ☐ **Businesses are reluctant to pursue or become involved in the programs primarily for reasons related to bureaucracy and the time pressures placed upon SME's;**
- ☐ **The sponsoring agencies/departments/institutions do not understand nor respond to their markets;**
- ☐ **Government assistance programs are either competing against or at least not cooperating with each other.**

As a result, available programs are not used to advantage, and those that are used, are successful primarily because of strong personal guidance provided by someone throughout a cumbersome process. This is compounded by the fact that **SME's lack or tend to ignore information and many often do not know their real needs**. Further, the survey found that **a specific credibility gap does exist between the private sector and governmental agencies or departments charged with assisting businesses**. Bridges between the two senior levels of government and regional businesses should be more formalized to permit more frequent contact on matters related to technology and diffusion.

The needs analysis confirmed that **a serious gap in technology does exist between many SME's within the Greater Hamilton Region and global competitiveness.** Without question, **ample appropriate technologies exist to make SME's competitive internationally as does information exist regarding those technologies and market opportunities.** The key question is how to access the information and understand the technologies and opportunities presented.

Clearly, to be effective, the technological capabilities of the receiver must equal those of the provider and **there is an acute shortage of technologically qualified managers and employees within the Region.** The Region has a strong, coordinated initiative well underway to enhance skills training and investment, which could be the nucleus of a model for other communities. But payback takes time and the existing shortage will be compounded by demands from the Free Trade Agreement and the advent of Europe '92. Without an infrastructure of such skills, companies cannot develop technical solutions to problems nor enhance their technological capabilities. **The universities and colleges are not meeting the needs of industry.** The problem rests more with society, however, than with the capabilities of those institutions. **The profile of science and technology must be raised within the community as a whole.**

Technologically oriented entrepreneurs can play an important role in bridging the gap and enhancing the Region's efforts to diversify. The underlying causes behind the well known high mortality rate of start-up and new businesses, however, is threatening. **The Region has two unique programs,** one well established and the second well underway, to encourage and support entrepreneurs. These are the Business Advisory Centre, with over 200 professionals already networked to mentor businesses, and the Greater Hamilton Technology Enterprise Centre. The survey confirmed the importance of each to the economic growth of the Region and its strategic goals.

Examination of the various segments of each of the five sectors targeted for the survey found a definite interaction and, to a degree, interdependence among each. It also found that **each contained a segment related to environmental needs.** This, plus the presence within the Region of existing environmental industries, made it clear that a sixth sector specifically related to environmental opportunities should be integrated into the Region's S&T initiative.

Although the survey yielded a number of key findings and resulting recommendations, some stated, others implied, two very specific, action oriented conclusions emerged from the project. Both relate to the **need to access information** regarding the availability of technologies and market opportunities to business; the need for business to be able to understand and respond to those opportunities while recognizing the shortage of qualified personnel and time pressures; and the need to have this **assistance tailored to the business community needs of the Greater Hamilton Region**. As such, this report recommends that the Region take immediate steps to:

- ☐ Investigate the feasibility of establishing an information centre designed to meet the technology transfer and associated assistance needs of business within the Region.
- ☐ Place within the Region an appropriately qualified individual dedicated to enhance global competitiveness of the Region's business/industries through technological advancement.

Most importantly, the project confirmed without doubt the **extreme importance of the Region itself to economic development and global competitiveness**. It is the environment of that community that generates the strength necessary to meet the challenges and to take advantage of the opportunities. This was reflected in the leaders who sparked the Science and Technology Initiative and was inherent in those interviewed throughout the project. **All strategies and action steps developed to impact the restructuring of Greater Hamilton for the global market must contain this important community element.** It is a decisive, competitive weapon.

PREFACE

A great deal of discussion has and is taking place about Canada's technology prowess, or lack thereof. The subject has been thoroughly analyzed and documented. All conclude that **the profile of science and technology in the community must be raised**. Although some action is being taken, it is far outweighed by rhetoric. The publicity is necessary but, as this survey concludes, **the awakening process is just underway for many businesses and particularly SME's. This must be accelerated**. That's not news, as the following facts and quotations confirm, but it does reemphasize the need for all facets of the economy, led by industry, educational institutions at all levels and regions, to understand today's competitive environment and to move together. It's not a need. It is an imperative.

The equation:

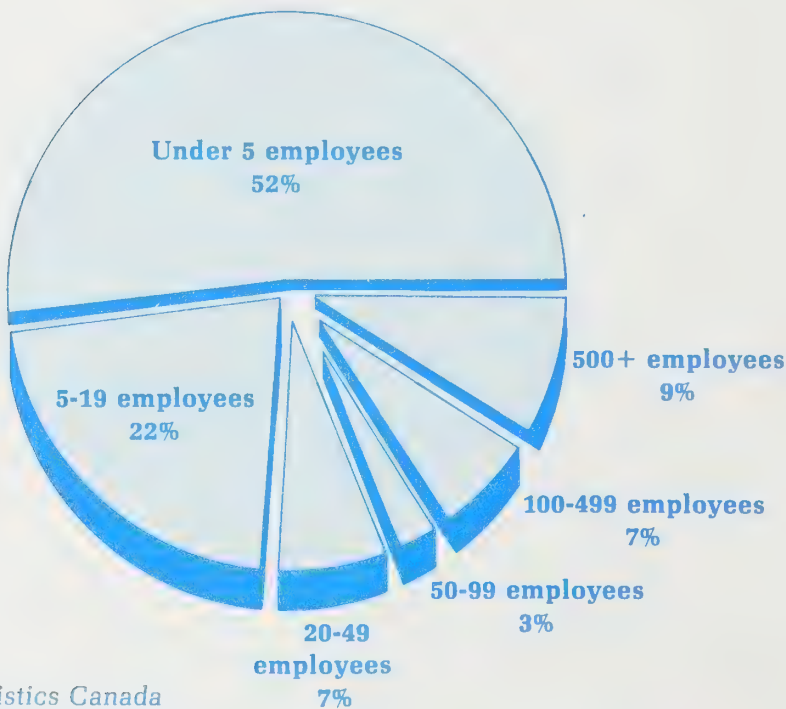
$$\text{GLOBAL COMPETITIVENESS} = \frac{\text{TECHNOLOGY}}{\text{PEOPLE}}$$

**98.8% OF COMPANIES IN CANADA
ARE SMALL BUSINESSES**



(Fig. 2)

JOB CREATION IN CANADA, 1978-1986
Total net change in jobs, all industries



(Fig. 3) Statistics Canada

BASIC FACTS AND QUOTES RELATED TO THE SURVEY



98% of all companies in Canada are small businesses. (Annual revenues less than \$2 million and fewer than 100 employees) (Fig. 2)

Since 1984 more than 80% of new jobs created in Canada have been by small businesses. (Job Creation Fig. 3)

The State of Small Business (MITT)



Since 70% of Canadian firms have no employees with even a community college or CEGEP level technical education it is very difficult for them to develop technical solutions to problems.

Canadian Chamber of Commerce FOCUS 2000



A January 1989 survey by Statistics Canada of 800 manufacturers revealed that 14% complained about a shortage of skilled workers severe enough that they were experiencing actual production difficulties.

Hamilton Spectator, February 10, 1989



Canadian governments try to catch up by leaping on the latest bandwagon. If robotics seems to be the key element in Japan's industrial success, then we put up a robotics centre, ignoring the fact that robotics depends for its success on the availability of highly skilled, intelligent, creative and innovative workers.

Walter Pitman, Director,
Ontario Institute for Studies in Education, Globe & Mail
September 23, 1989



By 1995 trade in computers, aerospace equipment, electronics, machinery and drugs will represent a quarter of all goods traded in the world.

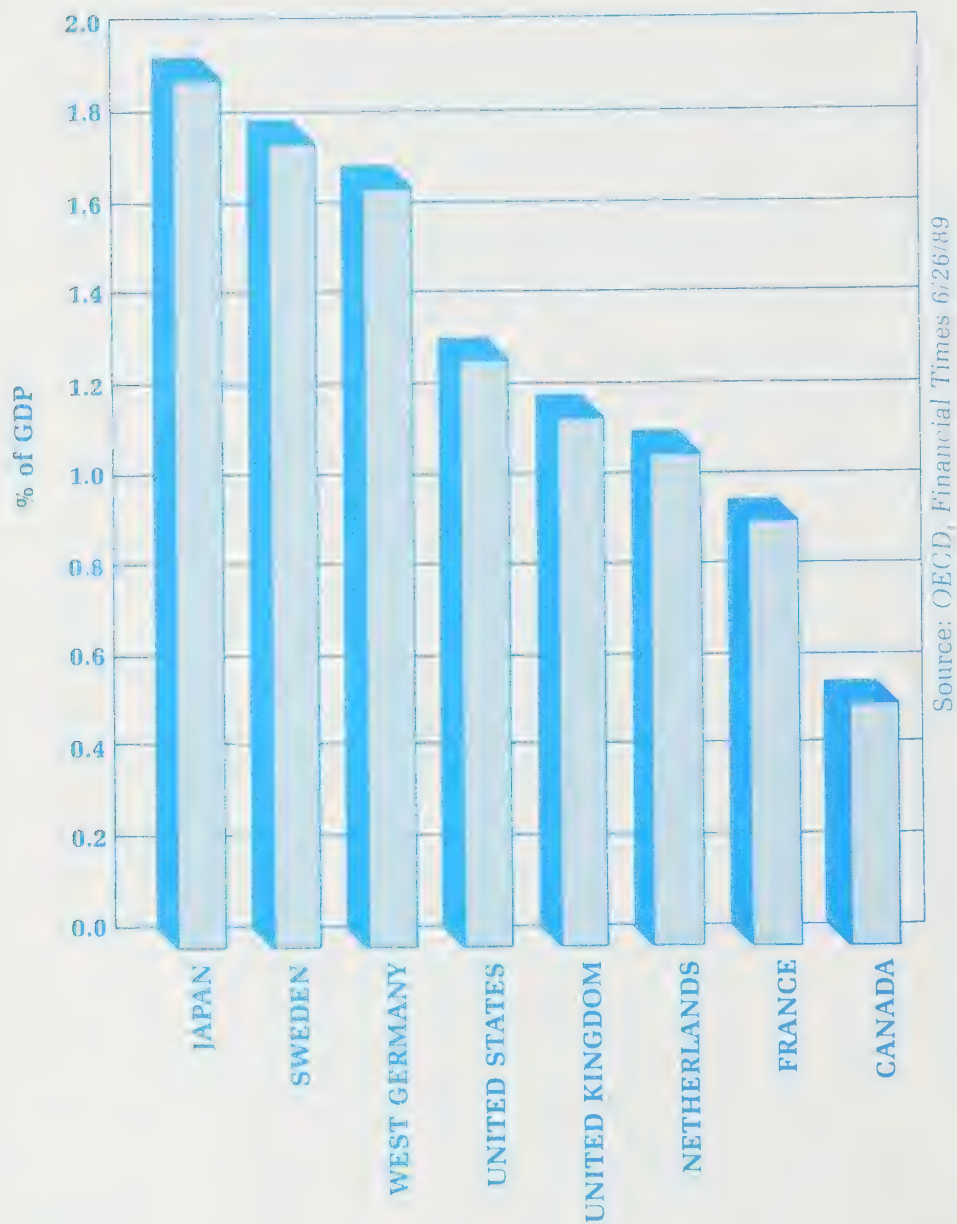
OECD, Globe & Mail, May 20, 1989



We import 76% of our machinery, 40% of our electrical products, 80% of our health care equipment.

Larkin Kerwin, President, National Research Council
Globe & Mail, March 3, 1989

A HIGH-TECH UNDER-ACHIEVER
Industry-funded R&D as a percentage of GDP



(Fig. 4)

FACTS AND QUOTES



In 1980, we imported \$10.5 billion worth of advanced technology goods, while exporting \$5.9 billion worth. By 1987, we were importing \$20.7 billion of high-tech products, with exports of 13.6 billion. Thus, our trade deficit in this sector that is so vital to our future economic health rose from \$4.6 billion to \$7.1 billion in just 7 years. These figures tell us much about the standard of living Canadians can expect in the coming century. Where have we gone wrong?

Walter Pitman, Director,
Ontario Institute for Studies in Education, Globe & Mail
September 23, 1989



Italy spends \$2 billion more a year on R&D than Canada, despite having a gross domestic product that is about \$140 billion smaller than Canada's. (R&D funding Fig. 4)

The top 10 U.S. companies (in total) spend nearly 5 times the total Canadian R&D expenditure.

Geoffrey Rowan, Globe & Mail, May 20, 1989



Out of 13 countries studied, Canadian high-school students ranked 11th in biology, 11th in physics and 12th in chemistry. 17% of high-school graduates were found to be functionally illiterate.

The Prime Minister
The Financial Times of Canada, June 26, 1989



One out of every 20 business owners in Canada is under 25 years of age. Almost one-third of all business owners are under 35 years of age.

Statistics Canada, FBDB Profits, Spring 1989



Depending upon how they are classified, anywhere from 80% to 95% of all Canadian businesses are privately owned, with the vast majority owned by families. Family owned businesses employ over 60% of the labour force and account for 40% - 50% of the GNP. Research shows that less than 30% of family businesses make it through the next generation with less than 13% surviving the third generation.

Laventhol & Horwath



Fewer than 10% of Canadian businesses believe that advanced technology is important to their future.

Information Technology Association of Canada
Globe & Mail, May 20, 1989



A lack of information on technology is not the obstacle which it is often claimed to be. Information exists but firms do not know how to access the right resources nor do they understand their business well enough to know what information they need to introduce new technologies.

The Canadian Chamber of Commerce, FOCUS 2000



Canada does not have a national intelligence and information system. Parochial attitudes, resistance to change and a lack of cooperation among provincial and federal governments, education and industry are the ingredients for decline.

Fraser Mustard, President,
Canadian Institute for Advanced Research, Financial Times
June 26, 1989



Simply put, Canada is unable to compete because it lacks the knowledge to do so effectively.

Larkin Kerwin, President, National Research Council
Globe & Mail March 3, 1989



The ability to make effective use of technology is probably more important in many regions than the ability to create technology.

A critical role for the community is to facilitate exchange of information amongst the advanced technology sectors within the community.

While there is a tendency to talk about a nation's science and technology prowess, the foundations of national competitiveness are really found in the institutions and characteristics of specific communities or regions within countries . . . differences in community size, orientation, infrastructure, financial resources and human resource strengths.

1989 National Technology Policy Roundtable



A surprising theme that emerged from the conference was the importance of the region, rather than the nation state.

International Federation of Institutes for Advanced Studies Conference,
The Financial Post, October 31, 1988



Relating to the trend towards de-emphasis of the importance of industry and manufacturing . . . "I am afraid that the risk in the trend is that the critical importance of a solid manufacturing base to a healthy growing economy will be forgotten. I hope that this does not mean that Canada will find itself on the sidelines of the great game called International Business".

Akio Morita, C.E.O., the Sony Corporation



Our industrial progress has been based largely on inherent advantages such as abundant natural resources and ready access to markets. But in today's world economy, success is determined more by scientific, technological and managerial adaptability and responsiveness . . . achieve industrial excellence and international competitiveness through integration of our efforts in industry, science and technology . . . The need is immediate.

ISTC, Meeting the Challenge



Structural change will continue, as the transition to an information economy proceeds and the impact of technological diffusion transforms manufacturing and service industries. Building on strength - realizing opportunity is the economic strategy for the Region.

Hamilton-Wentworth Strategic Plan, June 1986

BACKGROUND

Although there has been some movement in recent years for Hamilton-Wentworth to diversify into other areas including more accent on health care, **the Region's economic base traditionally has been heavy industry oriented.** The existence of light and service industries and agriculture within Greater Hamilton created potential, however, for further diversification and this has become an integral part of the Region's economic strategy. The importance of this became most apparent during the economic decline of the early 1980's, when heavy industry sectors shrank the job market and the Region's overall productivity and competitiveness suffered. Such a downturn had particular impact because as the centre of Canada's **Industrial Heartland**, a substantial population was seriously affected (over 600,000 within Greater Hamilton and more than one million when contiguous, dependent regions were considered). **Diversification and overall industrial/commercial upgrading were urgently needed** and the Region began to mobilize accordingly.

A science and technology initiative led by industry has been underway within the Region for some time as evidenced by a number of community activities including the Business Advisory Centre (BAC); the Hamilton-Wentworth Skills Training Advisory Committee (HWSTAC); the McMaster Internship Manufacturing Engineering Program (MIME); the Industry-Education Council (IEC); and the Regional Chairman's Advisory Council (CAC). Early in 1988, however, discussions with business, government and university representatives indicated a general concern regarding the overall competitiveness of the Region. It was felt that important elements of the community were indifferent to such significant issues as enhanced technological competitiveness and global competition. This would present an increasing threat to the Region's economic well being. The same applied to a perceived underutilization of potentially useful industry/business support services available locally in university and college circles and from government services and programs. Finally, there did not appear to be an appreciation of the need for industry/business particularly at the small and medium size enterprise (SME) level to be up-to-date technologically. These concerns led to further questions related to how SME's become aware of technologies that might apply to their businesses and what mechanism would be best suited to ensure rapid, effective technology awareness/transfer/diffusion.

A clear consensus resulting from the discussions was the need to bring together representatives of large and small businesses, business organizations, McMaster University, Mohawk College and the three levels of government to review the situation, establish a network of concerned parties and determine a course of action. Working together, the Business Advisory Centre (BAC) in Hamilton, the Office of the Regional Chairman and the ISTC office from Toronto arranged a dinner meeting in June 1988 for a carefully selected group of participants (Appendix I). The focal points for discussion included:

- ☐ The best means of promoting the importance of science and technology (S&T) to small and medium size enterprises (SME's);
- ☐ Effective dissemination of S&T information to the business community;
- ☐ Raising the federal S&T role and presence in Hamilton-Wentworth;
- ☐ Relevance of the Free Trade Act (FTA) to this;
- ☐ What federal S&T policies can best support the Region's diversification;
- ☐ Opening the university/college/SME relationship;
- ☐ Regional promotion of McMaster/Mohawk's S&T capabilities;
- ☐ Ensuring a regional S&T network has the right middle/senior contacts;
- ☐ What Ontario economic developments will impact the region soon;
- ☐ Identification of other technology transfer networks across Canada.

A number of concerns were discussed quite openly and the group concluded that additional information would be needed if the questions raised were to be addressed properly and an effective course of action developed. As a result, it was agreed that an outline of what technology related support programs and services were already available from federal, provincial and academic levels would be compiled (**Resource Inventory**) and a survey would be conducted to determine what business and industry considered to be their technology related needs (**Needs Analysis**).

ISTC was assigned the responsibility of developing the Resource Inventory, which would catalogue science/technology/business resources and related financial assistance programs. This would become the basis for discussions with companies from five designated sectors for the Needs Analysis. A steering committee comprised of representatives from business, the Business Advisory Centre, ISTC and Regional government would appoint a private consultant to conduct the Needs Analysis.

THE SECTORS

Five advanced technology sectors had been selected for the project. Resources as they applied to each would be catalogued and businesses related to each would be interviewed. The sectors included:



Each of the sectors is a part of the Region's economic strategy, each has a presence and is related to strengths within the community and each falls within the objectives of the Premier's Council for Competing in the New Global Economy. **The sectors targeted offer a spectrum of opportunities** (Fig. 1), which extend well beyond those noted on the tree chart.

THE PROJECT

RESOURCE INVENTORY

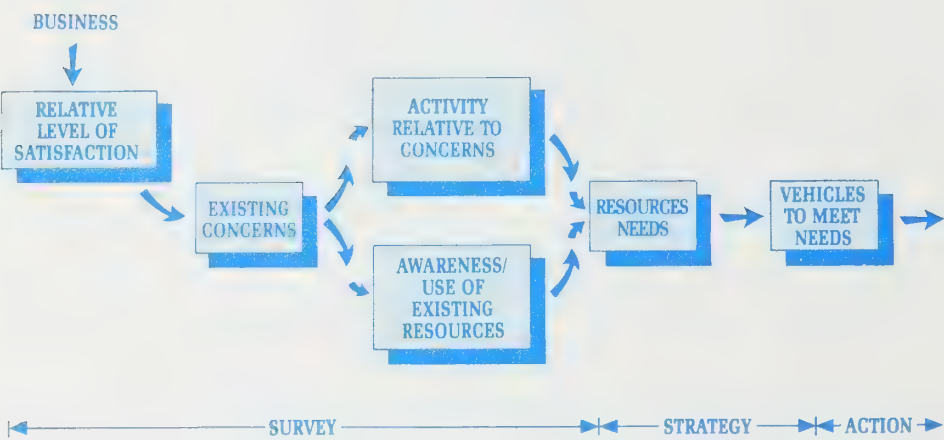
Following evaluation of the scope of the project, ISTC decided to contract with the private consultant to develop the Resource Inventory. The purpose of the inventory was not to detail the resources available to business but rather to determine what agencies and programs existed that could be applied to each of the targeted sectors. A format was developed which would lead to a matrix indicating the sponsoring agency or institution, the specific program offered by business function and noting whether the possibility for financial assistance was included or not.

Although there were a number of contributors to the creation of the matrices, the prime responsibility was given to a person uniquely qualified to carry out the assignment. He had a number of years in business management, had been with governmental research organizations and had knowledge with hands on experience in working with such programs. Even with this background and a high degree of personal energy, the matrices required several hundred dedicated hours to complete.

It must be remembered that the MATRICES REPRESENT A FIRST DRAFT, WERE NOT INTENDED TO BE ALL INCLUSIVE AND ARE SUBJECT TO CHANGE. In fact, changes which have occurred to date have not been incorporated into the matrices. Copies of each matrix are included as an appendix to this report as Advanced Materials; Automotive; Food Processing; Health Care; Telecommunications.

SCIENCE AND TECHNOLOGY INITIATIVE

SURVEY PROCESS



(Fig. 5)

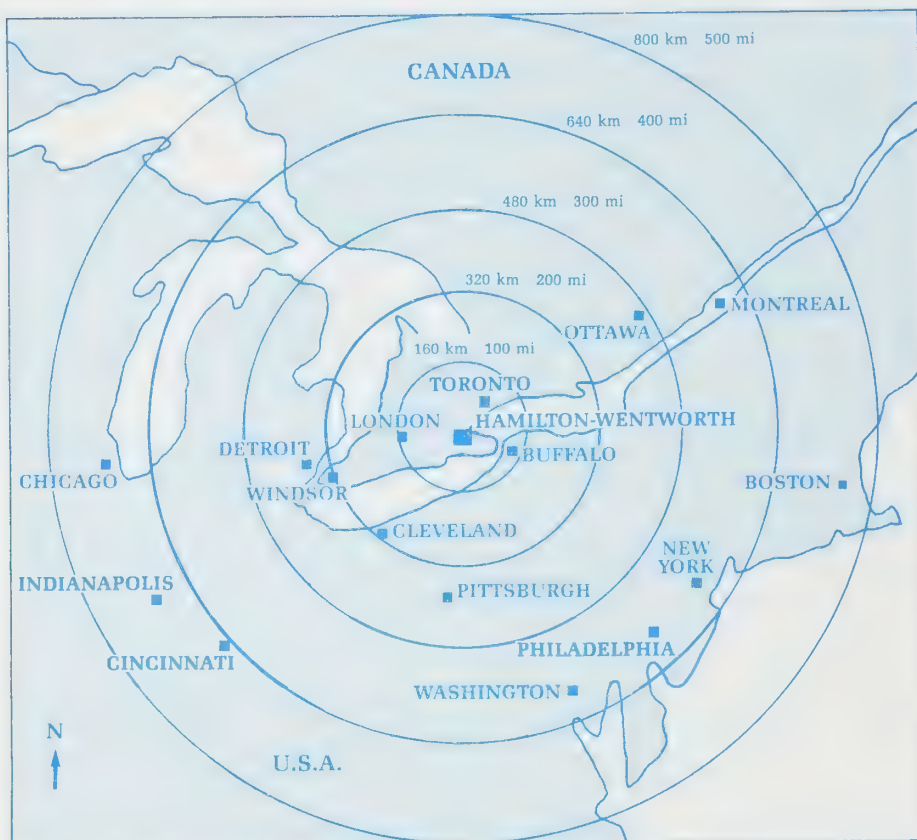
NEEDS ANALYSIS

The principal objectives of this facet of the initiative were to determine among small and medium size businesses (SME's) their perceived technological needs for global competitiveness, their use or view of the resources available to them and to recommend a course of action based upon the findings.

Objectives established by the steering committee to probe more fully into the questions being addressed by the Needs Analysis included:

- ☐ To ascertain what the Region's business and industry considers are its technological needs to ensure international competitiveness in the five sectors noted;
- ☐ To determine what business and industry view as the best means of meeting those needs particularly with reference to:
 - a) international investment options
 - b) international technology transfer
 - c) regional technology transfer
 - d) enhanced business/industry technology awareness
- ☐ To identify those programs and services which could best support meeting those needs from
 - a) among those already existing and ready made
 - b) those which should be adopted
 - c) new ones which should be designed
- ☐ To assess whether the management philosophies and practices of companies interviewed are relevant or appropriate to handle the recognition, acquisition and application of new technological developments pertinent to their sector;
- ☐ To recommend the mechanism best suited to ensure rapid, thorough technology transfer, diffusion and awareness in the Region among private sector, academic/institutional and government circles.

The approach would be to conduct in-depth interviews with senior management responsible for operation and determining the future of businesses representative of each sector. Initially, the intent also was to use mailed questionnaires; however, it soon became apparent that personal interviews and discussions were far more effective and the survey was focused accordingly. The survey process was to determine the relative level of satisfaction of each business, their awareness and use of existing resources, and the best way to meet their needs. (Fig. 5) Questionnaire guidelines were developed (Appendix VII) to be used along with the matrices for the interviews.



**The Region is within one day's trucking
of almost half of the U.S. population.**

(Fig. 7)

SURVEY AREA

The Greater Hamilton Region, for the purposes of this survey, was defined to cover the same area as that established for the regional office of the federal government's Department of Supplies and Services (DSS). (Fig. 6) This is appropriate for **the economic influence of Greater Hamilton extends well beyond the core of Hamilton-Wentworth.**

A key factor in the Region's commercial importance is its **strategic location for trade with the United States and internationally** through the St. Lawrence Seaway system. Greater Hamilton is within one day's trucking of half of the population and over half of the industrial manufacturing of our trading partners to the south. (Fig. 7) Furthermore, more than 40% of all border crossing between the two nations takes place at Niagara's four border points. This is expected to increase even more as the Free Trade Agreement (FTA) gains momentum. The Region is the principal conduit for FTA and, as such, creates both great potential for opportunity and an exposure for vulnerability.

GREATER HAMILTON MARKET AREA

Products - Services



(Fig. 6)

INTERVIEWS

All interviews were on a *personal and confidential basis*. Senior managers of businesses from each sector were asked to examine their own firms, others they knew from personal experience plus share their perception of the sector's businesses in general. Although the survey concentrated on SME's*, executives from large multinationals, related service industries and institutions were interviewed to determine their perceptions of how SME's related and responded to the changing technological environment. The interviewees were selected because of their presence in the Region and the sector. A few from outside the Region were chosen because of their knowledge and influence in the sector. These included companies and industry specialists who have global insight into technological trends and play a role in influencing the technological pace of their sector. The interviews normally were conducted over two or more hours of discussion using the general questionnaire guidelines found in Appendix VII. With the exception of regional offices, representatives of governments were interviewed only to learn more about the scope of assistance programs available and to obtain market statistics.

In addition to the 68 interviews described above, numerous discussions, or mini-interviews were conducted with a wide variety of business people from the Greater Hamilton Region. This provided further insight into the Region's business community, its resources and networking system. In all, over 350 hours of interview time were devoted to the project.

On February 9, 1989, a follow-up networking dinner was held (Appendix VIII) at which time the consultant presented the Resource Inventory (Matrices) and the preliminary findings from the initial interviews. From there, the survey moved into full gear.

- * For the purpose of this survey, SME's were defined generally as:
Small being under 100 employees and less than \$2 million in sales;
Medium being the next step in infrastructure ie: not owner managed,
an emerging threshold company, etc.

ASSISTANCE PROGRAMS

A key objective of the survey was to get a reading from companies who had used assistance programs included on the matrices to determine SME's experience base, reaction and results. From this a general assessment of the programs presently offered, those needed and business attitudes would be possible. A goal was to ascertain where gaps existed and how to fill them.

The matrices were a critical tool used throughout the survey. The reason for this is quite simple. **Most businesses, large and small, are just not aware of the programs available.** There is a general awareness in the business community that federal, provincial and regional assistance exists; however, to be useful, being aware has to be more substantive. Many of those interviewed had at least limited experience with a program, which provided the basis for an examination of business attitudes, but only those associated with universities were using programs at the time of the interviews.

When reviewing the matrices, those interviewed were astounded at the number of sponsoring agencies, programs and functions covered. The general impression was that there were too many, too much overlap. This could not be explored in any depth, however, because of their lack of familiarity with the subject.

This lack of knowledge and activity proved to be somewhat of a surprise, although, judging from the effort needed to develop the matrices, it probably should not have been. The interviews did not provide sufficient information to develop a meaningful assessment of available programs nor specifics on existing gaps. **It was possible, however, to develop an accurate assessment of business attitudes and perceptions.**

Although assistance sponsoring agencies undoubtedly have conducted market research including follow-up analysis of their programs, a coordinated study involving a number of key agencies and programs at both the federal and provincial level seems warranted from the business perspective.

ENVIRONMENT

"The traditional business, which permitted many Canadian businesses to make profits without concern for innovation and technological development, is not conducive to today's globally competitive economy. Canada's business culture is too risk averse in many cases and lacks sufficient entrepreneurial spirit; and it is not sufficiently attuned to how new technologies could help stimulate company growth and profits.

A preoccupation with short term results is not conducive to effective utilization of technology."

Quoted from the Canadian Chamber of Commerce Task Force examining Canadian business and reported in their publication *FOCUS 2000*. The same findings have been confirmed numerous times by studies including the Premier's Council in their report *COMPETING IN THE NEW GLOBAL ECONOMY*, by the National Technology Policy Roundtable sessions and was very apparent throughout this survey. It is uncontested.

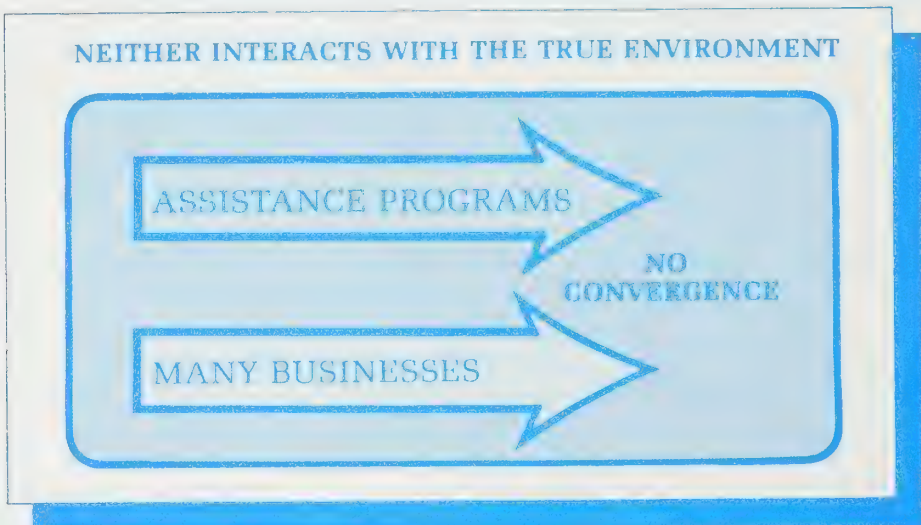
The management of SME's lack or ignore information. Complexity increases when realizing that each manager or supervisor must wear several helmets and cope with a survival mode of operation. Each is personally involved with the many facets and disciplines of business. Time is precious and harassment common. They acknowledge that change is happening, is inevitable, is important and that assistance is needed. Time and dollars to become educated, to make contacts, to remain informed and to be involved are principal concerns in an atmosphere where the relative level for frustration is low. It's even more difficult to think of spending money to convert a process that is already generating revenue or have patience with a foreign culture when seeking out a technology transfer arrangement. It is from this perspective that new technologies and assistance programs are viewed. **It is a distinct, existing environment.**

Another micro-environment also exists. This relates principally to the agencies or institutions offering assistance programs and more particularly to those associated with governments. Many in those offices are well educated, usually technologically well informed and well intentioned, but often quite bureaucratic in nature and always subject to bureaucratic pressures, and normally reasonably secure in their position. Their technical knowledge is enhanced by attending seminars, trade shows and international travel on a fairly regular basis. It is from this perspective that business is viewed. While much of the same holds true for the institutional environment, governmental departments have the authority to extend funding assistance to businesses.

MANAGEMENT/PROCESS/PRODUCT TECHNOLOGICAL CHANGE



(Fig. 8)



(Fig. 9)

Two distinct micro-environments have evolved. **SME's already have to pay some penalty for late technological change** (the question is: how much?) and those responsible for funding assistance programs are aware of the leading edge for change without the means or authority to implement it. (Fig. 8) Both are operating in parallel, without convergence. **Neither is interacting with the true environment.** (Fig. 9) *The resulting gap has created a definite, existing lack of credibility between the private sector and government agencies sponsoring technical assistance programs.* The survey indicated, from the perspective of business, this may be attributed to:

- ☐ A lack of continuity in agencies, programs and personnel due to political changes and transfer/movement of officers/administrators. Most all programs are viewed as being politically driven.
- ☐ Overly bureaucratic response by sponsoring agencies to enquiries, applications by business and in the processing of requests for help. Great detail requirements and paperwork; lack of easy, understandable access.
- ☐ Substantial delays in response, processing, action time by the sponsoring agency, which frequently jeopardizes project success and kills enthusiasm.
- ☐ A too often lack of understanding or competence on the part of the officer or administrator relative to the program itself and to the project involved. Guidance is expected and needed. Much seems to depend upon personality.
- ☐ Ineffective communication among agencies and often among departments within the same agency. A lack of cooperation among agencies often perceived as counter-productive competition. More inefficiency.

Clearly, the **gap can be narrowed and eventually closed only with proactive, cooperative efforts by both business and the agencies or departments involved.** There are signs, including the motive behind this survey, of this beginning to happen.

THE SECTORS

AUTOMOTIVE

With total direct employment of more than 130,000, the automotive industry is Canada's largest single manufacturing sector. Because of the Automotive Products Trade Agreement executed in 1965, automotive trade between Canada and the United States increased from \$1.2 billion in that year to \$62.6 billion by 1985. There is now a \$110 billion business in the production of automotive parts in North America with the Canadian share amounting to about \$14 billion. The importance of this common market is emphasized further by the fact that the industry in Canada is upwards of 90% production dependant upon shipments to the U.S.A. Because of the dominant foreign influence including the influx of imports from outside the pact and overseas investment in Canada, most of what impacts the Canadian industry is generated elsewhere.

Major restructuring has been occurring within all levels of the sector and this will continue. The dynamics that influence that industry have been analyzed in depth and a great deal has been published or made readily available. Canadian manufacturers/suppliers to the automotive manufacturers (OE's) are well informed and have a clear understanding of what has to be done to remain successful. This relates to the businesses operating in the Tier 1 level and the more successful ones working in the Tier 2 level. (Appendix IX). Marginal Tier 2 companies and those in Tier 3 as well as those just serving the automotive aftermarket are quite vulnerable. In fact, some industry analysts feel that for a number of companies it's already too late.

The automotive industry is well represented within the Region.

About 80% of the original equipment parts plants are located in Ontario and particularly within the Industrial Heartland. There are more than 400 auto parts manufacturers concentrated around Greater Hamilton employing 60,000 people and virtually all of North America's automotive industry is within less than 2 day's trucking (Fig. 7). Additionally, the prime suppliers and research facilities for advanced materials and components are based locally.

The significant amount of consolidation and downloading occurring in the sector is forcing SME's to take on responsibilities that exceed their abilities. As a result, mergers, acquisitions and joint ventures are being considered by companies whose management traditionally has been extremely secretive and protective of their businesses. Often, the company will concentrate on one facet of the business (eg. a strong tool & die shop) while overlooking other needed disciplines. Such focus usually stems from the background of the founder and reflects his strengths.

Many are weak in marketing and commercial skills, which compounds these limitations. All are so wrapped-up in the daily demands of business that short term thinking is prevalent and not conducive to taking on new technologies. Most also correctly believe that technologies exist to solve future problems, yet they have virtually no technical staff on board and do not consider time delays for acquisition and implementation.

Again, all of the executives contacted were astounded by the number and variety of services and financial programs contained in the matrix. Most had never availed themselves of these resources and those who had, had done so under strong guidance from the Ontario Centre for Automotive Parts Technology (O.C.A.P.T.), private consultants or a specific program officer. In each case, hand-holding was the key. The same bureaucratic concerns previously noted also existed in this sector plus an underlying skepticism about working with government. This related more to practicality than to philosophical questions.

Every company interviewed had or were experiencing serious difficulties because of the shortage of skilled workers. One, who had installed an apprenticeship program has lost all enthusiasm for it because of the burden of administration and the fact that, once accredited, company loyalty diminishes with the active job market at hand.

Very little contract research or development is conducted although this would fill a definite void for a good number of SME's. The Ontario Research Foundation (ORF), now Ortech International, and similar institutions, but not universities, have been used for testing as recommended by O.C.A.P.T. and consultants, but not for the research, development and design work needed by SME's. It should be noted that Ortech International has an active research program for this industry, but not in the context defined here. There is a need to guide SME's in this direction with easy access to the proper supporting assistance programs. The dynamics of the industry are starting to change a mindset that has been always to try to do it yourself.

Interestingly, some Tier 3 and some just serving the aftermarket were the few from all of the sectors that felt assistance programs should be 100% grants instead of matching funds, low interest rate loans, etc. These same firms exhibited an overlying perception that all of their problems related to money and to organized labour.

Licensing, except for the more sophisticated firms where it seemed to prevail among subsidiaries of the same parent, was not considered viable. Most new technologies were procured in the form of production equipment to manufacture existing products. Some thought is being given to the possibility of joint ventures to meet the downloading requirements of the principal automakers. What many of today's parts manufacturers could bring to a JV, in the view of several analysts, however, was questionable.

Trade shows, without question, are the principal source of information regarding technological developments. While true for all, this was especially so for those having limited OE exposure.

Trade associations including the Automotive Parts Manufacturers Association (APMA) and the Canadian Manufacturers Association (CMA) were generally viewed as lobbyists perhaps favoring, in many cases, their larger sized members. Neither was seen to be a leader in technological change nor, apart from networking, as a source for technical information. The Automotive Industry Action Group (AIAG) from Southfield, Michigan, is considered to be a reliable source of technical information, as was O.C.A.P.T.

The most basic needs perceived by this sector include:

- ☐ **Technologies related to production or process**
 - to gain cost effectiveness and quality
 - to cover the gaps created by WHIMIS, Bill 208, etc.
 - to meet the downloading requirements of the OEM's
- ☐ **Technologically skilled employees as**
 - machinists and technicians for production and Q.C.
 - managers to find, implement and manage technologies
- ☐ **Information sources to advise and guide in the**
 - learning of technology trends, resources, availability
 - accessing of available financial assistance and service resource programs.

ADVANCED INDUSTRIAL MATERIALS

This sector includes and impacts significantly all sectors. **It is a key to the future industry opportunities for many businesses in Greater Hamilton.** Important research is being conducted in the many facets of this sector within the Region by both industry and institutions. The organizations active at McMaster University include: the Institute for Materials Research (IMR), the Institute for Polymer Production Technology (MIPPT), the Centre for Electrophotonic Materials and Devices (CEMD) and the Ontario Centre for Materials Research (OCMR). Additionally, the Canadian University-Industry Council on Advanced Ceramics (C.U.I.C.A.C.) is headquartered on campus. Industries including the nation's steel industry with extensive research facilities as well as other institutions including Ortech International are an integral part of the local scene. The sector is vital to the Region's economic growth. It also is too diverse and complicated to address in any detail.

The credentials of those individuals and of the facilities in this research work are world class. Funding by industry and university related programs is accessible. **The blending of financial assistance from agencies oriented toward universities and those focused on industry, however, is complicated and accents the need for closer cooperation from the agencies involved. This is a problem faced by all sectors.** A prime example of this, which turned out to be successful and could be precedent setting, involves NSERC money being brought into a research venture funded by IRAP for a C.U.I.C.A.C. investigation of ceramic superconductors. This also included a sizeable contribution from the project's corporate sponsors. Structuring of the arrangement was very difficult and required almost two years to complete from inception. As would be expected, intellectual property considerations added to the complexity. C.U.I.C.A.C. also relies upon I.S.T.C.'s Technology Outreach Program (TOP) to support its operations and is looking to the federal Networks of Centres of Excellence (NCE) contest to finance new research activities. These programs are necessary for the viability of the organization.

There is no question but that such programs are imperative if Canada's global competitiveness is to be enhanced, but C.U.I.C.A.C. is just one of many examples demonstrating the need for more understanding and closer cooperation between sponsoring agencies as well as a truly dedicated effort on the part of the applicant. Although this one was successful, negotiation time created delays and detracted from the actual research itself.

Underlying forces which drive technological developments in this sector include: the need for new, quality products to lead competition; cost effectiveness in raw materials, production and applications; environmental issues; plus all the factors that impact the other sectors.

Relatively speaking, there is limited pre-competitive basic research being conducted in Canada. With a very few exceptions, institutions and large companies are the only ones involved. SME's do not have the capability nor the priority as they are reactive to market demands often flowing from developments made outside the country. As, such SME's tend to be categorized as trend followers by purchasing agents of multinationals searching for product/process enhancement and by industry analysts.

Universities, institutions and large companies researching advanced materials have their funding channels in place. Although the financial assistance is not always to the extent desired by the scientist or organizations, procedures are established and parameters understood.

Service and support assistance is needed, however, for spin-offs and new companies involved in the further R&D of materials, particularly as they are transformed from the pre-competitive stage to actual product design and development. A number of corporations have mechanisms in place to assist start-ups normally in exchange for rights of access or an equity position. New businesses not wanting to avail themselves of these opportunities and, having often come from an academic or research environment, will need both business and financial assistance. This becomes even more important when recognizing that venture capital is extremely difficult to obtain in Canada. **The sector is open to all forms of technology transfer and diffusion.**

The sector needs strong encouragement stimulated by business/industry for more intense R&D into advanced materials. This would be facilitated by creating easy access to technical and market trend information and continuing, cooperative assistance programs. Process technologies to aid in the transfer of the materials into the actual development stage and to become commercially viable are of increasing importance. There is a perceived role for SME's in this; however, very little SME activity is taking place in this sector at this time.

HEALTH CARE

Annual public and private expenditures on health care in Canada exceeds \$40 billion. The Canadian market for medical devices is \$2 billion divided more or less evenly among medical and surgical equipment; disposables; and dental, ophthalmic, and orthopaedic equipment. **More than 75% of the medical devices are imported.** Further, the Canadian market for devices is only 7% of the U.S.A. market and about 2 - 3% of the world demand, which offers needed export opportunities for Canadian businesses.

The principal force impacting this sector is the need for more cost effectiveness. The key factors driving this include: the aging population, demographics; ongoing infectious diseases; the move towards ambulatory or out-patient care; and waste disposal. A trait throughout the industry, however, is that change does not happen quickly as product buying influences are very conservative.

This sector has a very strong presence within Greater Hamilton as evidenced by the Region's research facilities, medical school, teaching hospital network and related businesses. Additionally, a health care and medical technology business park complete with a start-up business incubator facility is included in the Region's economic strategy with work on that project well underway. The unique "health network" led by McMaster's Health Sciences Centre is world renowned.

Domination of the market by large multinationals; long payback periods associated with medical products; liability questions; and the need for sophisticated distribution both domestically and internationally all provide barriers for SME's. Reports indicate that about \$300 million is spent each year in Canada in the area of health care related research and development. More than half a million scientists, engineers and technologists are active throughout the sector. Very little of this, however, translates into SME businesses except that some of the work performed and knowledge gained creates opportunities for spin-offs and new businesses.

Those interviewed either had sufficient internal funding to support their technological endeavours or had basic research completed through the university system and were now facing the rigors of business. None were conversant about federally and provincially funded assistance programs in general and the matrix was well beyond their comprehension. IRAP had been used to a limited degree but not nearly to full advantage because of concerns about lengthy delays and time consuming reporting requirements. **All felt that assistance in the transition from research to further product development and launch would be an important asset to business development** but doubted the accessibility of such programs. An executive of one small firm has to travel to a trade show in Japan later this year and refuses to apply for PEMD assistance because of the time and effort needed. Another executive expressed frustration with the "IRAP-Trap" referring principally to delays in receiving payments and the problems that caused.

McMaster University is regarded as an excellent resource possibility but not easily accessed. The main complaint was that no central authority seemed to exist to facilitate coordination and development of programs. Questions related to working with the university or similar institutions were of a practical nature, not philosophical.

There was some limited interest in the potential for licensing in or out but **joint ventures were viewed as being more beneficial**. For the most part, **success comes to SME's when they are specialized and niche oriented**. Licensing is perceived as forfeiting a part of the market and/or giving up proprietary knowledge. Also, to compete globally, joint ventures usually add scope to the business not otherwise attainable.

Because of the Region's "health-care network", the concern over finding skilled technicians and qualified employees present in other sectors was less of an issue. The demands upon a spread-thin management found in the other sectors were quite prevalent in health-care also.

Trade shows were the primary source for keeping abreast of technological development as well as, to a lesser degree, publications and technical literature. All were quite concerned about the time, effort and difficulty involved in tracking the myriad of factors that could impact their ability to survive and grow.

Medical Devices Canada (MEDEC), formerly the Canadian Association of Manufacturers of Medical Devices (CAMMD) was not well known. Following discussion, however, the concept of MEDEC was seen as a good one as was the proposed Technology Institute for Medical Devices for Canada (TIMEC). In fact, during the review of this sector, it became clear that both MEDEC and TIMEC could have significant positive influence on the growth of the medical device business in Canada and their programs are underway.

There is great need in this sector for SME's to have quick, easy **access to information particularly regarding**

- **trends in technologies and markets;**
- **opportunities for collaboration, joint ventures, etc. for access to market niches domestically and globally;**
- **emerging occupational health opportunities; WHIMIS, etc.;**
- **MIS systems for hospital, technology, management;**
- **services and programs available to assist in development and implementation of technologies and in moving their products into the international marketplace.**

FOOD PROCESSING

In value added and employment, the food processing industry in Canada ranks second only to transportation equipment. The sector generates over \$15 billion in revenue and directly employs 95,000. It is a complex industry that literally includes everything that happens to all food and beverage products from the "farm gate" to the final consumer. Further, it is a major market for the related industries of packaging, chemicals, machinery and transportation. Yet, **Ontario is a net importer of food.**

The principal driving forces impacting the sector include the consumer's move towards freshness; the processor's move towards value added; consolidation within the industry; the major retail outlets demanding increased sophistication from their suppliers; and the need for more cost effectiveness at all levels. It is a fragmented industry not organized from a Canadian perspective and characteristically has a low level of technological innovation and pace of change. FTA offers unique niche marketing opportunities for Canadian businesses but, generally, free trade is feared.

The industry has a strong presence within Greater Hamilton.

Approximately 2,000 processors have been identified within Ontario and many are located in the Golden Horseshoe bordering Lake Ontario. The Region's commitment to this sector is manifested in a number of ways such as an already funded business start-up incubator unit to include food processing and specific plans within the published economic strategy for a food industry park.

Although, as in the other sectors, there are a number of world class Canadian companies within the industry, the function of this survey was to interview those perceived to be more vulnerable. There are ample of those within the food processing sector. The influences they face are unique and range from coping with marketing boards to the need to be more sophisticated in packaging and delivery but charge less. Of equal concern are the consequences of escalating land values in southern Ontario enticing their suppliers, customers or even themselves to exit the business. Many SME's are family owned businesses with established traditions, mindsets and frequently an emerging generation facing transition. **Often this group has the ambition to introduce technological progress but lack the technical skills and support infrastructure to do so.**

Virtually all of the companies interviewed, including some very sophisticated ones, had little or no knowledge of the scope of the programs outlined on the matrix. Some had used or were aware of others having used IRAP programs but always with strong guidance from the Ontario Centre for Farm Machinery and Food Processing Technology, a consultant or specific program officer. Again, hand-holding throughout the entire process was mandatory. When reviewing the matrix, most indicated that they had been "missing the boat" but simultaneously expressed serious concern regarding the process and administration necessary to obtain and implement the assistance. It is important to note that several stated the need to have technologies developed outside Canada, where accessible funding was possible, then purchased back on an as needed basis. Most thought the Ontario government was not supportive of the industry and one, headquartered in Ontario but with links to another province, applied to the programs of that province instead.

As with other sectors, many of the SME'S did not have technical people on staff and, while the need to fill that void was admitted, there were no specific, immediate plans to do so. Their products met the established standards required by law.

The use of universities/colleges or independent testing laboratories when needed was commonplace but the SME's did not look to those institutions for true development purposes. The potential for properly supported contract research and development clearly exists. While adequate testing facilities exist, serious concern was expressed regarding the need for a pilot plant or production vehicle to help carry new products from development through test marketing.

There is little sign of technology transfer or diffusion among many SME's. A movement does seem to be starting to explore that need; however, it will require guidance and support. Although financial assistance may come from governmental agencies, the technological guidance and administrative support must be industry led. Government's motives are questioned. The Ontario Centre for Farm Machinery and Food Processing Technology was considered by many to be an important link to new technologies but that no longer exists. The province is viewed as being supportive of this sector for products to the "farm gate" but not from the "farm gate" through processes to the consumer's table.

Trade shows are the primary source of information on technological developments. Trade associations are not. They generally are regarded as lobbyists siding with multinationals. **Although a self-created network does exist among many SME's, nothing is formalized and this is a perceived weakness in the industry.**

The key needs of this sector include:

- **process technologies for adding flexibility to production; economy of scope, not of scale;**
- **technologies and the means for developing uses for food by-products and waste disposal;**
- **packaging technologies to provide freshness, extended shelf life and food preparation by the consumer;**
- **information systems for quality control, distribution, market trends and opportunities;**
- **an inventory of skilled employees and managers particularly at the post-secondary and post-graduate levels;**
- **easy access to assistance programs and services and the guidance necessary to understand, obtain and manage such resources.**

TELECOMMUNICATIONS

Telecommunications is one of the most dynamic industries in the world with technological progress as its principal driver of growth. In Canada, telecommunications accounts directly for about 18% of the total electronics market but close to one third of all electronic output eventually is designated for that application. Annual consumption of electronic products in Canada is approximately \$13 billion. Over 93,000 people are employed by this industry in Ontario and the sector is expected to grow globally at an average annual rate of 9% over the next ten years. While Canada enjoys a trade surplus in commercial communications and telecommunications equipment, the balance of trade in electronics remains negative. Further, the electronics industry is dominated by wholly-owned subsidiaries of foreign firms.

Although Greater Hamilton has a telecommunications industry base, including the Communications Research Laboratory at McMaster and such giants as Westinghouse, this sector does not have a strong presence within the Region. It is, however, targeted by the Region for expansion and there presently exists a complementing representation of companies involved in advanced electronics.

While the dynamics of the telecommunications industry demands acute technological awareness and constant progress, the advanced electronics quotient and service industries are more reactive to change, usually depending upon their customers for innovation and are quite vulnerable to global competitiveness.

A great deal of contract research is conducted within this sector. The Telecommunications Research Institute of Ontario (T.R.I.O.), Communications Research Laboratory (CRL) and others particularly within universities are research intensive geared to the advancement of the industry in general. There is a balancing question in that at some point, specific aspects of the research must be turned over to industry for product development and launch. While such institutions devote a portion of their time to the practical matters of business, their principal thrust is non-competitive research. This can pose a dilemma in that the priorities in time and energy of two different facets of the industry often are far apart. Also agencies funding research within such institutions including NSERC and URIF work to different parameters than those focused on the business world. Those operating in a university environment have sound knowledge of programs available to them and a good working relationship with the appropriate agencies. When combined with industry participation, this can be useful in leveraging to maximize available benefits; however, the mandates and administration of polarized sponsoring agencies can be very complicated.

As in the other sectors, those interviewed were not aware of the extent and variety of services and financial assistance programs available. The survival and growth pace of the more successful companies tended to be funded through maximizing of a product maturity which, in turn, financed the next generation. Within the SME's, IRAP had served a purpose but not nearly to its full potential. The need to use assistance was out-weighed by the frustration of having to use it. Program directors were thought to be competent in matters related to technology but not understanding of business. As with the other sectors, the bureaucracy element was the principal barrier. There also was concern that programs locked in too tightly to the statement of work did not allow enough flexibility for other opportunities that might evolve from the development work, regardless of its merit. Along with this was the frustration that as much work is required to obtain funding for smaller projects as for large ones. The implication of this is that a number of opportunities fall by the wayside because of cumbersome administration. Most programs were thought to be politically driven to create jobs, not technology. Simply put, the race in this sector is too fast to be assisted, in the minds of the participants, by programs that are not adequately responsive.

A serious concern expressed by those interviewed was a **lack of skilled technical personnel within the Region**. Businesses within this sector tend to locate within easy reach of each other and fit well within the "growth pole" concept. Greater Hamilton has an industry presence, however, and the technologies for telecommunications inter-relate closely with the other sectors, ie. medical imaging, but the Region will have to attract more related businesses. In addition to the skills question, management relies upon networking to keep abreast of developments. Trade shows, particularly for the SME's, are considered to be an excellent source of information both from seeing product developments and networking. **The availability and easy access of the flow of information is vital.**

The Premier's Council reports that "Barriers to entry will continue to grow in high end businesses and the low end businesses will become increasingly dominated by competition from low wage manufacturers". SME's are tending to look off shore more for inexpensive components than for technological improvements. A thin management team meeting the demands of daily business seems to impose this, although managers are aware of the need to move forward technologically.

Contrary to the other sectors, **licensing was considered to be a quite acceptable way of acquiring or selling technology.** It is an expeditious way to meet a technological need and is consistent with the dynamics of this sector. The initiatives undertaken by T.R.I.O. reinforce this approach. SME's have a problem, however, by not having sufficient tentacles to identify and pursue such opportunities in a timely, cost effective fashion.

University laboratories are considered to be an excellent resource subject to the priority concerns and financial assistance restrictions previously noted.

The greatest needs perceived by this sector are:

- **to develop a continuing inventory of qualified, skilled technicians and managers;**
- **to have available responsive assistance programs particularly to permit extended contract research;**
- **to have accessibility to an effective information flow regarding technologies and market trends and opportunities.**

KEY FINDINGS

■ With few exceptions, a serious gap in technology does exist among many SME's within the Greater Hamilton Region and global competitiveness. This includes technologies related to process, product and management. It is not a surprise to observers nor to most of the businesses.

■ Ample technology exists to make the SME's competitive internationally. Government Service and financial resources also exist to assist SME's in meeting that objective. Private sector funding including banks and venture capital are not filling the needs. All must be recognized, made available and tailored to meet market needs. Time is of the essence.

■ A specific credibility gap exists between the private sector and governmental agencies or departments charged with assisting businesses by sponsoring service and financial assistance programs. Simply stated, business will have to increase its awareness of what is needed to be competitive and what resources are available internationally to help, and government will have to be more empathetic to the reality of SME needs. **Both will have to understand their markets and work together.**

■ Although government involvement in stimulating and assisting technological involvement within industry is an imperative, business is skeptical of the principal thrust of government's programs; its ability to understand and to respond to industry; its cost effectiveness; and, very importantly, its accessibility. **Accessibility** means competence; empathy; authority or ability to act; a physical, user friendly presence; and continuity.

■ On the other hand, government justifiably doesn't understand why business doesn't do more on its own and waits so long to act. The gap can widen but several initiatives are underway which will help to resolve this with effective **networking** beginning to replace rhetoric.

■ There is definite interaction and, to a degree, interdependence among all the sectors. Technologies often intertwine and each sector represents market potential for some segment of the other. This is true particularly as the sector tree chart is expanded. (Fig. 1).



All technologies needed to make SME's globally competitive exist. Information regarding those technologies is **available somewhere**. The problem is that SME's take that availability for granted, do not understand their needs nor the implications of change including time and talent required, and **have little access to information sources to help institute change**.



Many, if not most, **SME's do not have on staff engineers** or managers capable of understanding new technologies nor the ability to interact to advantage with available resources. The universities and colleges are not meeting the needs of industry. The problem rests more with society than with the capability of the universities and colleges.



There is an acute shortage of skilled workers for most levels of business in each sector. The Region has a strong, coordinated initiative well underway to enhance skills training, however, the payback takes time and, in the interim, a definite shortage exists. This will be compounded by the FTA and the advent of Europe '92, when European sources of skilled workers become more difficult to tap. The role of community colleges is significant.



The **universities and colleges are underutilized for research and especially for development**. Academe is an incredible resource. It is well represented within the Region. It houses the brains, technical/physical facilities and a proven ability to help access and leverage funding not understood by business. However, academic institutions are viewed by many as not practical, not business oriented and not readily accessible. University orientation is strategic, tending to be long term for research, whereas, industry orientation is immediate. Universities are geared toward pre-competitive research to advance technologies within a sector normally for publication and public knowledge, while industry is focused with proprietary needs. To achieve a mutually acceptable balance between these is not easy but, clearly, necessary.



Community colleges are focused on applied research, which is more easily understood by business. Although not used to advantage by SME'S, the colleges are a good resource for existing product/process improvement assistance. This is not understood by SME's. The colleges are recognized as an excellent source for trained personnel.



Other external resources available to business also are not fully recognized for their potential. The most prevalent usage of such facilities traditionally has been for independent testing, not for design nor development. The increasing importance for contract R&D, however, will enhance the function of these resources.



The importance of contract research for design and development projects is emerging as an important tool for SME's to catch-up and become more competitive. Although viewed as a short term solution, It can be an effective, economical way to fill an existing void within the SME's and will create interesting opportunities for those qualified to take on the projects. Adjustments to meet business needs will be required.



Many senior managers regard government sponsored trade missions as boondoggles. This is a general opinion but those expressing it had either participated in a mission or had seriously considered joining one. The same feeling was held for missions coming from other countries as, while they were sector specific, they were not adequately focused on the actual needs of the host company. The "let's sit and chat until we find something to mutual benefit" concept is not popular.



With the exception of the faster paced telecommunications industry and T.R.I.O., **SME'S had little or no awareness of the Centres of Excellence**, their function and possible relationships. Discussions of the concept, however, proved to be positive although concern was expressed frequently that they might be confined to large companies.



Canadian trade associations have not played a role in the eyes of most SME's, in promoting technological change. Most often, they are seen as being lobbyists often favoring their larger members. MEDEC is an exception to this and announced intentions of others, including the Canadian Manufacturer's Association, may have impact in time. The associations can be a catalyst for networking. Action, however, instead of words will have to be demonstrated.



There is a very specific, **negative response to having to travel into Toronto** or deal with Toronto based offices. The reasons for this ranged from time/convenience questions to local pride. On the federal level, most stated they would rather work with Ottawa because it was as easy to reach and was perceived to have more authority. **A local presence is a must to be truly effective.**



The survey was undertaken from a regional perspective and this proved to be a valid approach. The businesses surveyed exhibited a strong community spirit and allegiance. More than had been anticipated.



Although some expressed concern or resentment about government trying to guide the direction and location of businesses, there were no philosophical reservations about working with government labs or agencies nor universities to enhance a firm's technologies. There were many practical concerns, principally related to timeliness. It was assumed that costs would be in line and intellectual property questions could be resolved.



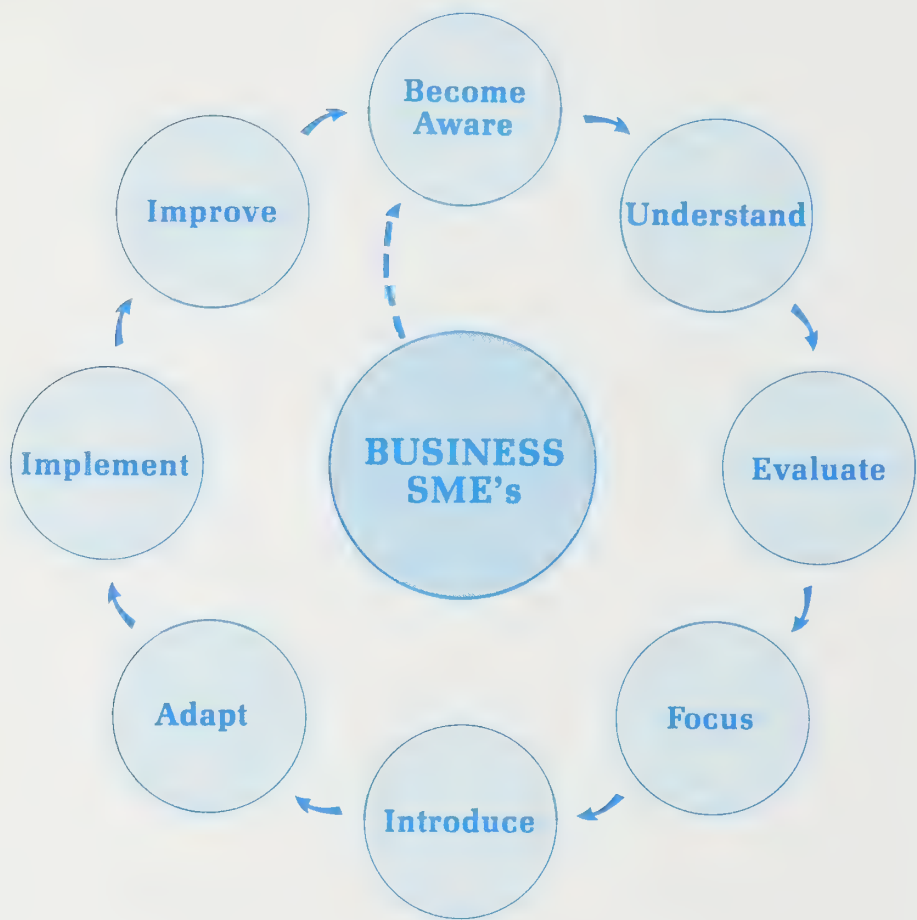
The preferred way among SME's to obtain technological advancement today is:

1. **Internally generated;** or, in most cases, evolved. Dedicated design and development efforts are quite limited - some obvious exceptions - and process or product improvements happen empirically.
2. **Outright purchase.** The technology is implemented and, apart from service contracts, the obligation ends. Today, this normally relates to new machinery or processes acquired to upgrade a plant, a software program for internal controls, or a product design. Contract research could fit within this category.
3. **Joint ventures.** The more progressive SME's clearly preferred this avenue as all parties had to bring something of mutual benefit to the table and could grow, sharing the risk, together. A number of companies, however, had experienced problems, frustration and failure from difficulties in coping with different cultures and business practices.
4. **Licensing.** This was the least popular, with exceptions noted particularly in telecommunications and advanced materials, because it was viewed as giving away market share or proprietary knowledge. It was seen to be difficult to administer with no real return over time. Licensing out to or in from overseas sources was discounted because sights did not extend that far and those who had explored such possibilities, had the usual coping problems. Several companies with both domestic and international subsidiaries or joint ventures used licensing for internal transfer of technology.



The key, without question, to past success of SME use of assistance programs sponsored by government, or any other source, rests with the government program officer or individual (occasionally a consultant) responsible for that applicant. It boils down to an ability to sell, perseverance, tenacity and hand-holding. Companies who had used a program in the past admitted that they could not have been successful in obtaining or administering the program without this outside help. Further, those companies had not gone after other programs because no such individual had reappeared on the scene. **Government, at all levels, does have a necessary advocacy role to play in this regard.**

**MANAGEMENT/PROCESS/PRODUCT
TECHNOLOGICAL CHANGE**



(Fig. 10)

SUMMARY

The fundamental intent of the survey was to use the findings **to recommend an approach** to address the key questions; facilitate development of longer term strategies; help the SME'S to begin overcoming basic weaknesses; enhance the existing network; and stimulate interaction among businesses, academe and governments.

Although each sector has forces impacting its immediate environment that are unique to that sector, **there are underlying forces that play upon all SME's facing global competitiveness** in advanced technology. Realizing the pace of market dynamics in today's world; the daily pressures and personalities of SME's; and the true mandate of those charged to assist economic growth within industry, **the key function is accessibility to information and to understand the opportunities presented** (Fig. 10).

SME's lack or ignore information. Information is available. SME'S fail to take advantage of information because it is not easily accessed nor understood. The information available is not easily accessed nor often available in a form easily understood. Information provides the basis and stimulation for networking. **Networking creates access to many disciplines and opportunities.** Information has to be sound and to be presented by a credible source. The findings of the survey indicate that **accessible information is a key starting point.** To be credible, it must be presented by industry. And, to be truly accessible, credible and an integral part of networking, **it must be available locally.**

Information in the context of SME technological needs relates to resources and markets. Resources, in addition to information regarding the availability of technologies, includes a "user- friendly" understanding of service and financial assistance programs available to assist with the acquisition and implementation of technologies. As noted throughout this report, needed programs are not being used for reasons which could be compensated for in an industry driven, regional information centre. Markets relates to new product availability; market sizes, characteristics and trends; joint ventures, licensing, acquisition opportunities; etc. The detail required of the information to be made available must be examined separately but it need not be all inclusive. **A central source for basic intelligence, interpretation, guidance and assistance with follow-through is the core required as is the need to have technologically qualified people to make it work. The technological capabilities of the receiver must equal those of the provider.**

RECOMMENDATIONS

The key findings of both the development of resource inventory project and the business needs survey clearly support, as an initial step, the need to create a regional knowledge transfer station rather than research centres. The information centre would be available to all, but should be designed particularly for SME's within the Greater Hamilton Region. Further, there is an immediate need to have available within the Region a technically well qualified, business oriented quarterback to serve, in addition to other important functions, as technical facilitator, interpreter and guidance counselor or mentor for SME's. (Appendix XI).

As such, the next phase of the Region's Science and Technology Initiative should include immediate action steps to:

- ☐ Investigate the feasibility of establishing an information centre designed to meet the technology transfer and associated assistance needs of business within the Region. (Appendix XI).
- ☐ Place within the Region an appropriately qualified individual **dedicated to enhance the global competitiveness of the** Region's business/industry through technological advancement.

Additionally, the Region must continue to support and expand its initiatives to recruit, develop and deliver technologically qualified employees to all levels of business. This includes raising the profile of science and technology within the community as a whole and working with its educational institutions to develop programs to meet the needs of SME's while creating an atmosphere to attract and graduate candidates. Existing programs include:

- McMaster Internship Manufacturing Engineering Program *MIME*
 - Industry Education Council *IEC*
 - Hamilton-Wentworth Skills Training Advisory Committee *HWSTAC*
 - Partners In Excellence
 - Regional Chairman's Advisory Council *CAC*
-
- ☐ **Develop the Hamilton-Wentworth experience linking the Region's science and technology and training needs (as supported by I.S.T.C. and C.E.I.C. at the federal level) into a process or format to meet human resource demands.**

Technologically oriented entrepreneurs can play an important role in bridging the gap and enhancing the Region's efforts to diversify. The underlying causes behind the well known high mortality rate of start-up and new businesses, however, is threatening. The Region has two unique programs, one well established and the second well underway, to encourage and support entrepreneurs. The survey reconfirmed the importance and the need to support these programs:

- **Business Advisory Centre BAC**
- **Greater Hamilton Technology Enterprise Centre GH-TEC**

The survey examined five advanced technology sectors each of which contained a segment related to environmental needs. This plus the presence within the Region of existing environmental industries makes it clear that a sixth sector specifically related to environmental opportunities should be added. As such, steps should be taken to:

- ☐ **Inventory appropriate resources and create a Matrix for Environmental Industries.**
- ☐ **Survey the industry to assess its needs and trends and to develop strategies to assist in its growth.**

Networking already active within the Region is vital for the growth of all businesses and especially SME's. The effort to expand this must be proactive and should be spearheaded by the industry led Regional Chairman's Advisory Committee using all resources available in the community. The recommendations of this survey were designed to aid in that process.

- **Enhance the credibility of the two senior levels of government on matters related to technology and diffusion. Bridges between them and regional businesses should be more formalized to permit more frequent contact.**

The findings of the survey and the many complicated issues involved could create an almost never ending listing of recommendations. To be truly effective, however, the recommendations must be result oriented based upon the needs and strengths of the Region and doable within a short time frame. ***The more strategic considerations evolving from this project should be integrated into the Region's ongoing Science and Technology Initiative.***

APPENDICES

APPENDIX I

SCIENCE & TECHNOLOGY INITIATIVE INDUSTRIAL HEARTLAND NETWORKING DINNER

GUEST LIST - JUNE 22, 1988

- | | |
|--|---|
| Mr. W. Sears
Chairman
Hamilton-Wentworth Region | Dr. G. Torrance
Dean, Faculty of Business
McMaster University |
| Mr. M. Carson
Chief Administrative Officer
Hamilton-Wentworth Region | Mr. Michael St Amant
Director
Innovation Ontario Corporation |
| Mrs. J. Mongeon
President
Hamilton Chamber of Commerce | Mr. J. Ratz, Coordinator
Field Advisory Service,
Ontario Office
National Research Council |
| Mr. S. Ghanem
Director, Economic Development
Hamilton-Wentworth Region | Mr. R. G. Blackburn
Assistant Deputy Minister
Policy and Evaluation (EPOL)
Dept. of Regional Industrial
Expansion |
| Mr. R. McCormick
Executive Director
Business Advisory Centre | Mr. Don Ross
Chairman, Regional Economic
Development Committee
Hamilton-Wentworth Region |
| Mr. D. G. Hysop
Vice-President Quality & Strategic
Resources
Westinghouse Canada Inc. | Mr. Ed Dyson
President
Manufacturing Research
Corporation of Ontario |
| Mr. Paul J. Phoenix
President and CEO, Dofasco Inc. | Mr. M. Mongeon
John Dydzak Enterprises Ltd. |
| Mr. F. Telmer
President, Stelco Steel Inc. | Mr. R. Stanbury, P.C., Q.C.
President
McMaster Business Advisory
Council |
| Mr. B. Boatman
President and C.E.O.
Tridon Ltd. | Mr. R. Kuhns
R. Kuhns and Associates |
| Mr. D. Fell
President, Fell-Fab International | Mr. L. Smith
President and CEO
E. D. Smith & Sons Ltd. |
| Dr. A. Heidebrecht
Dean, Engineering
McMaster University | Mr. W. W. Cram
Regional Executive Director
Ontario Region, DRIE Toronto |
| Dr. R. Childs
Dean, Faculty of Science
McMaster University | Mr. G. V. Kelly
Director-General
Industry Development
DRIE Toronto |
| Dr. S. MacLeod
Dean, Faculty of Health Sciences
McMaster University | Mr. J. R. Hammill
Director, Technology Transfer and
Investment Development
DRIE Toronto |
| Mr. Vince Frankovich
Chairman of Math Dept.
Mohawk College | |
| Mr. K. Glegg
V. P. Industrial Development
National Research Council | |
| Mr. W. McGregor
Executive Manager
Canadian Institute of Industrial
Technology | |

AUTOMOTIVE PARTS

SCIENCE/TECHNOLOGY RESOURCES AND RELATED FINANCIAL ASSISTANCE PROGRAMS

Legend

- indicates a resource
- X indicates a financial assistance program

**Industry, Science and Technology
Canada**

Technology Transfer Initiative:

Support Services Available for Business & Industry
Ontario Industrial Heartland

Issue No. 1: Feb/89

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Technology Transfer Initiative:

Support Services Available for Business & Industry

Ontario Industrial Heartland

Issue No. 1: Feb/89

BUSINESS RESOURCES AND RELATED FINANCIAL ASSISTANCE PROGRAMS

AGENCY	PROGRAM	PROVINCIAL										FEDERAL										Statistics and Service Canada										Industry Science and Technology Canada														
		Innovation					Premiers Council					McMaster University					Energy, Mines and Resources					Natural Sciences and Engineering Research Council					Industry Science and Technology Canada					Statistics and Service Canada					Statistics and Service Canada					Statistics and Service Canada				
FUNCTION		Innovation					Premiers Council					McMaster University					Energy, Mines and Resources					Natural Sciences and Engineering Research Council					Industry Science and Technology Canada					Statistics and Service Canada					Statistics and Service Canada					Statistics and Service Canada				
		Industry Trade	Advanced Manufacturing and Technology	Ontario Centre for Research	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre	Ontario Laser and Light Wave Centre							
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Technology Transfer																																														
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Technology Personnel Support																																														

BIO MEDICAL AND HEALTH CARE

SCIENCE/TECHNOLOGY RESOURCES AND RELATED FINANCIAL ASSISTANCE PROGRAMS

FUNCTION	PROVINCIAL										FEDERAL										
	Premiers Council					Centres of Excellence					National Research Council					Statistics Canada					
AGENCY	Technology Fund					Technology Fund					Technology Fund					Technology Fund					
	Industry Research Program	Strategic Program	Technology Personnel Program	University Research Program	Ontario Laser and Light Wave Centre	Ontario Centre for Information Technology	Ontario Centre for Manufacturing Research	Research Institute of Ontario Corporation of Ontario	McMaster Institute of Health Sciences	Health Sciences Department	Brain	Institute for Molecular	Molecular Virology and Immunology Program	Monoclonal Antibody Facility	Industrial Research Laboratory	Can Institute for Scientific Transfer	Canadian Institute of Engineering	Program	Advanced Industrial Systems Development Program	Statistics Canada	Centres of Excellence
Research & Development																					
Manufacturing Management																					
Manufacturing Processes																					
Design for Prod. & Manufacturing																					
Quality Assurance																					
Testing																					
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Technology Personnel Support																					

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Industry, Science and Technology Canada

Technology Transfer Initiative:

Support Services Available for Business & Industry
Ontario Industrial Heartland

Issue No. 1: Feb/89

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PROGRAM	Trade and Technology					Capital	Client Market Development Trips	Consortium	International Projects Fund	Term Loans and Guarantees	Export Support Program	Investment Program	Industrial Co-operation	Overseas Agency	Cost Allowance	Export Development Corporation	Government Initiated Trade Fairs & Visitors	Industry Initiated Trade Fairs & Visitors	Project Building	Establishment of	Sustainment of	Gifts of Defence	Investment in	Industrial Research	Business	Defence Industry	Technology Outreach Program	Business Opportunities	Sourcing System	Marketing and																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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FOOD PROCESSING

SCIENCE, TECHNOLOGY RESOURCES AND RELATED FINANCIAL ASSISTANCE PROGRAMS

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**Industry, Science and Technology
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Technology Transfer Initiative:

Support Services Available for Business & Industry

Ontario Industrial Heartland

Issue No. 1: Feb/89

AGENCY	PROGRAM	FUNCTION	PROVINCIAL										FEDERAL									
			Premiers Council					McMaster University					Department of Communications					National Research Council				
AGENCY	PROGRAM	FUNCTION	Centres of Excellence					Centres of Excellence					Centres of Excellence					Centres of Excellence				
			Advanced Manufacturing Technology	Welding	Plastics Institute	Ortech	Research and Development	Advanced Manufacturing Technology	Welding	Plastics Institute	Ortech	Research and Development	Advanced Manufacturing Technology	Welding	Plastics Institute	Ortech	Research and Development	Advanced Manufacturing Technology	Welding	Plastics Institute	Ortech	Research and Development
AGENCY	PROGRAM	FUNCTION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
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Industry, Science and Technology Canada

Technology Transfer Initiative:

Support Services Available for Business & Industry

Ontario Industrial Heartland

Issue No. 1: Feb/89

AGENCY	PROGRAM	FUNCTION	PROVINCIAL										FEDERAL																																																																																																																							
			Ontario International Corporation					Ontario Development Corporation					Ministry of Revenue					External Affairs					National Research Council					Industry Science & Technology Canada					Statistics																																																																																																			
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			Trade Missions					Regional Trade Fairs					Capital Projects					Client Market Development					Consortium Development					International Projects Fund					Innovation Ontario Corporation					Term Loans and Guarantees					Export Support Program					Small Business Development Corporation					Investment Program					Research & Development					Industrial Co-operation					Accelerated Capital Environment					Export Development					Government Initiated Trade Fairs & Missions					Industry Initiated Bidding					Establishment of Project					Establishment of Can-US Defence Development Program					Industrial Research Assistance Program					Business Improvement Loans					Defence Industry Technology Outreach					Business Opportunities Sourcing System					Marketing and Statistics					Intellectual Property					Canadian Patent Office				
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APPENDIX VII

ROBERT KUHNS & ASSOCIATES SCIENCE & TECHNOLOGY INITIATIVE QUESTIONNAIRE GUIDELINES

1. Is the company satisfied with its present situation; what problems lie ahead?
What is considered to be its major opportunity – threat?
What steps are needed to react to that? How urgent is it?
2. Is the company concerned about the technologies it currently is using?
What product/process/management technologies are employed in today's operations? Do they do the job well enough?
3. Is the company selling outside Canada? outside North America? to where?
How important is export to the operations?
Is there interest in competing outside Canada?
What role will it play in the future?
How global will it become?
4. Does the company consider its products/production methods/management skills competitive enough for the international market?
What are the principal threats/obstacles? from where?
What are some of the experiences encountered so far?
How did the company react to it?
What is needed to be more effective?
How would that be achieved?
5. Does the company use or has it considered seeking outside equity (Canadian or foreign) or joint-ventures to improve its product, productivity or market share?
What circumstances led to that decision?
What were the results? why? are you still satisfied?
Are you or would you do it again?
What other alternatives would you explore?
6. What does the company presently do in the areas of,
product or process R & D
technology sourcing in Ontario, in Canada
technology sourcing in North America, abroad?
Are you actively searching for technology? what kind?
How extensive is the effort? with what results?
Will more be done in the future? where? why?
What emerging technology will need the most attention?
new materials, electronics, computer, human resources?
7. Does the company have technologies (other than products) that it would like to license or consider licensing?
What efforts have been made to date? with what results?
Have other companies approached you for technology? what?
If interested, what help would you like? if not, why?
What is the most effective means of protection?

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8. Has the company attempted or considered using innovation or R & D services at government or university labs?
If there was a need, why not? were they considered?
Do you have or know anyone with such experience? results?
Are you aware of the facilities and services available?
Should they be made more available commercially?
 9. Does the company have any philosophical questions about closer relationships with
government, universities, institutions (eg. hospitals)
for the purpose of pursuing R & D? Or commercialization of the products of R & D? What are they? Can they be overcome?
How, what would be the best way to explore this?
 10. Is the company aware of programs and services available to them in support of R & D, innovation and technology transfer?
How were you made aware of them? keep abreast?
 11. What image does your company portray?
A high service image? A high technical image? A high technical support image?
What tools do you use to get your message across?
What are some of the reactions to it? why?
 12. How does your company keep abreast of technological developments in its sector? associations? competition? what?
What is the most effective means for keeping current?
What is the greatest motivation to move technologically?
Technological obsolescence/state of the art pressure/
budget cycles/external environment/internal pressures?
 13. What are some of the R & D activities in this region that have caught your attention? why? where are they going? who else would be interested in it?
 14. What is the best means for acquiring new technology?
For your company
by R & D? by licensing? by joint ventures?
What are the perceived strengths/limitations of each?
What would facilitate your acquiring new technology?
What resources are needed to help you get it?
What do you prefer doing to share technology with others?
What alternatives would be considered?
What is the best means to enhance the awareness of new technologies? and the vehicles to get them?
 15. Would the company be willing to participate in a formal networking mechanism in this region?
What would be the most effective mechanism to stimulate interaction and assist companies with networking?
What would be the principal obstacles to this? why?
What do you view as best next steps?

APPENDIX VIII

SCIENCE & TECHNOLOGY INITIATIVE INDUSTRIAL HEARTLAND PROJECT PROGRESS REPORT DINNER, HAMILTON, ONTARIO FEBRUARY 9th, 1989

GUEST LIST

INDUSTRIES, SCIENCE AND TECHNOLOGY CANADA (ISTC)

C. Huot Assistant Deputy Minister, ISTC Ottawa
W. Cram Regional Executive Director, Ontario (Co-host)
D. Sirrs Director-General, Trade, Technology & Investment,
Ontario Regional Office
G. Kelly Director-General, Industry Development, Ont. Reg. Office
O. Cohn-Sfetcu Director, Investment and Technology, ISTC, Ottawa
J. Hammill Director, Investment and Technology, Ont. Regional Office
O. Corbu Technology Transfer Counsellor, Ontario Regional Office

OTHER FEDERAL REPRESENTATIVES

Dr. L. Derikx Director, Targetted Research, NSERC, Ottawa
J. Ratz Coordinator, Field Advisory Service, Ontario Office, NRC
W. McGregor Executive Director, Canadian Institute of
Industrial Technology, Winnipeg
Dr. J. Ross Director, Industry & University Programs, NDHQ, Ottawa
Col. G. Porter Director, Industrial Defence Resources, NDHQ, Ottawa

REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH

R. Whynott Hamilton-Wentworth Regional Chairman (Co-host)
M. Carson Chief Administrative Officer, Regional Government
D. Ross Councillor & Chairman of Economic Development Committee
S. Ghanem Director, Economic Development
R. McCormick Executive Director, Business Advisory Centre

POST SECONDARY EDUCATION

Dr. L. King Vice-President, Academic, McMaster U.
B. Allan Associate Dean, External Relations
M. McDermott Commercial Development Officer, Faculty of Health Sciences
W. Petryschuk Director, Management Technology Institute
H. Bastel Dean, Technology and Health, Mohawk College

BUSINESS

J. Mongeon President, Hamilton Chamber of Commerce
B. Boatman President and Chief Operating Officer, Linear Technology
B. Crockford President and General Manager
Valley City Manufacturing Ltd.
D. Fell President, Fell-Fab Products Ltd.
M. Fabris President, Fabris Industrial Mfg. Ltd.
S. Fletcher Chairman, Business Advisory Centre
N. Thomas Vice-President, Manufacturing Services
R. Kuhns R. Kuhns and Associates
G. Wright Sales Manager, Steltech

OTHERS

P. Friedman Director, Small Business Branch
Ontario Ministry of International Trade & Technology
M. St. Amant Director, Innovation Ontario Corporation

APPENDIX IX

AUTOMOTIVE PARTS INDUSTRY TIER STRUCTURE DEFINITION (GENERAL GUIDELINES)

TIER 1

Consists of those parts manufacturers supplying directly to the vehicle assembly plant. A Tier 1 supplier will possess all or most of the following characteristics:

- ☐ capable of research, design and development (CAD/CAM)
- ☐ possess a product or process technology niche
- ☐ capable of modular unit sub-assembly
- ☐ accepts full or shared responsibility for warranty
- ☐ accepts full responsibility for JIT delivery
- ☐ extensive use of automation and robotics
- ☐ more technology focus in manufacturing processes and not labour intensive
- ☐ majority of business is automotive
- ☐ large size company exceeding 250 employees
- ☐ good labour relations

TIER 2

Tier 2 consists of company with:

- ☐ possible R & D capabilities (CAD/CAM)
- ☐ capable of supplying on a JIT basis
- ☐ accepts full responsibility for quality
- ☐ less technology focus in manufacturing processes and more labour intensive than Tier 1
- ☐ small to medium size company
- ☐ less dedicated to automotive - up to 25% of business non-automotive
- ☐ aftermarket may be a principle business
- ☐ good labour relations

TIER 3

Consists of companies with:

- ☐ no R & D capability
- ☐ usually small companies with 50 employees or less
- ☐ high labour intensive operation
- ☐ auto parts portion of business may be less than 50%
- ☐ major customers are Tier 1 and Tier 2 companies

TIER 4

Consists of:

- ☐ raw material suppliers
- ☐ service suppliers such as tool & die, painting, heat treating, coating and packaging

APPENDIX X

MANAGER OF TECHNOLOGY TRANSFER

There is an immediate need to have available within the Greater Hamilton Region a technically well qualified, business oriented person(s) to serve as technical facilitator, catalyst, mentor and strategist as:

- ☐ assist all businesses and particularly SME's
- ☐ advise regional government and industry leaders
- ☐ interface with regional educational institutions
- ☐ interface with federal and provincial agencies
- ☐ raise the profile of S&T within the community

in matters related to achieving technological advancement for the Region's economic growth and global competitiveness.

The scope of the function obviously extends well beyond the Region itself, but must be based upon community needs, expectations and aspirations.

Creation of the position is especially important in light of the Region's need to expand its inventory of technically qualified post-secondary and post-graduate level managers. It also will aid in bridging the credibility gap between business and senior levels of government, particularly as it relates to financing and implementing appropriate resource assistance programs.

The Manager of Technology Transfer should play a key role in the ongoing S&T networking initiative and, as such, should report to the Regional Chairman. Additionally, the Manager should have strong linkage to the Industry and Regional Chairman's Advisory Council and particularly to the Greater Hamilton Technology Enterprise Centre. For accessibility, the group(s) should be located in the Tech. Centre.

APPENDIX XI

TECHNOLOGY INFORMATION CENTRE

The survey concluded that businesses within the Greater Hamilton Region have a specific need for, and will respond to, an information centre providing that it is truly “user friendly” and accessible. This applies particularly to SME's. The design of the centre both for facilities and equipment and for material content will have to be studied separately; however, some of the basic needs as perceived by the SME's are as follows:

<p>The principal sources generating awareness and knowledge of technologies determined by the survey are: (Ranked)</p> <ul style="list-style-type: none">Trade/Industry ShowsSophisticated End-usersIndividual InitiativeCompetition/CustomersLiteratureEmployeesTrade Associations	<p>Accessibility means:</p> <ul style="list-style-type: none">Competent staffResponsive to needsAvailable guidanceAuthority/Ability to actUser-friendly programsAppropriate programsComfortable environmentCommunity focusLocal presence
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When designing the centre, the concepts and strengths from these ingredients must be considered and integrated into the operational plans as much as possible.

Particular attention should be devoted to how the information is presented to the individual. The USER INTERFACE is more important than the vehicle that carries the information.

The centre should not try to be all-inclusive, but rather serve as an effective transfer station providing —

- Information: what is available and from whom
- Guidance: where to go, who to contact, advice on next steps
- Assistance: with applications, management of the programs

<p>Information needs include:</p> <ul style="list-style-type: none">Assistance resource availability (extension of the Matrix program)Available technologies (Globally) (process, product, management)Licensing, Joint Venture opportunitiesNew product opportunitiesR&D, testing resources, labs	<p>Facility needs include:</p> <ul style="list-style-type: none">Understandable computersDisplay area (for literature/products)Open work area/desks, etc.Social area for networkingPhones/copy machines, etc.Ample parking
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Costs: Until the centre is a proven entity with publicized success stories, SME's will be reluctant to pay for services. Larger companies or corporations could subscribe to have the programs available tied into their offices electronically.

The planned Greater Hamilton Technology Enterprise Centre would appear to be an excellent location for the information centre.

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